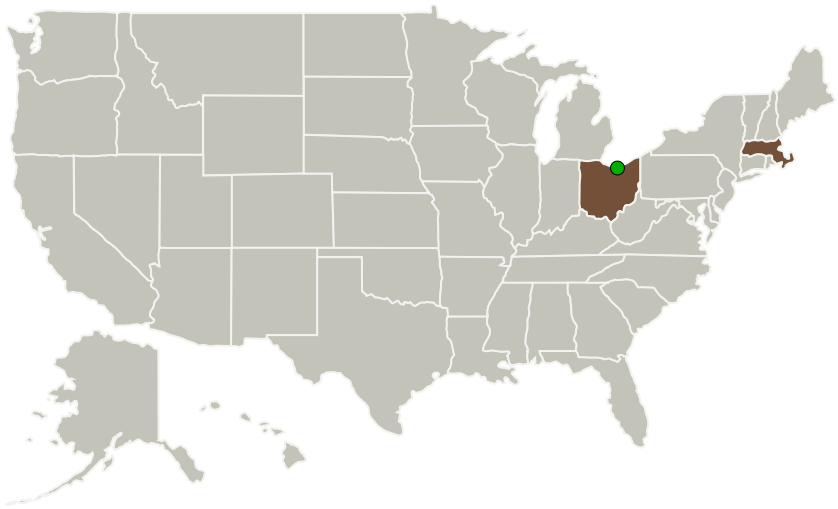
High Energy-Density Lithium-Sulfur Batteries with Extended Cycle Life, Phase I

Completed Technology Project (2017 - 2017)

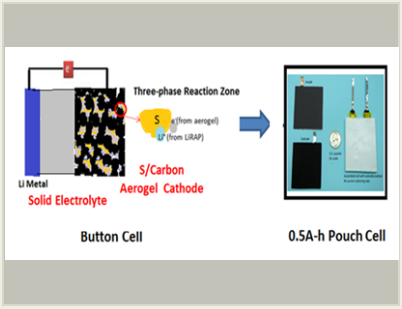
Project Introduction

Conventional lithium-ion batteries demonstrate great potential for energy storage applications but they face some major challenges such as low energy density and high cost. It is worthwhile to pursue alternative strategies to address the barriers of cost and energy density. In this project, we will develop advanced rechargeable lithium-sulfur (Li-S) batteries that have much higher energy density and lower cost. Our Phase I project will use a superionic solid electrolyte and sulfur-immobilized carbon matrix to reduce sulfur loss to the electrolyte and to increase the sulfur utilization. The full lithium-sulfur button and pouch batteries based on these components will be constructed to evaluate their electrochemical performance. Based on our preliminary data, it is anticipated that a 400 Wh/kg energy density of Li-S pouch cells can be demonstrated for a minimum of hundreds of cycles.

Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
Giner, Inc.	Lead Organization	Industry	Newton, Massachusetts
Glenn Research Center(GRC)	Supporting Organization	NASA Center	Cleveland, Ohio



High Energy-Density Lithium-Sulfur Batteries with Extended Cycle Life, Phase I Briefing Chart Image

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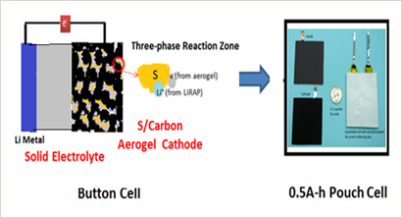
Primary U.S. Work Locations	
Massachusetts	Ohio

Images



Briefing Chart Image
High Energy-Density Lithium-Sulfur Batteries with Extended Cycle Life, Phase I Briefing Chart Image *(https://techport.nasa.gov/image/131465)*

Organizational Responsibility

Responsible Mission Directorate:
Space Technology Mission Directorate (STMD)

Lead Organization:
Giner, Inc.

Responsible Program:
Small Business Innovation Research/Small Business Tech Transfer

Project Management

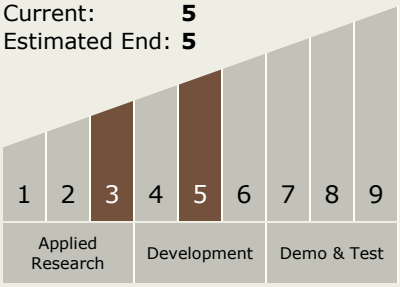
Program Director:
Jason L Kessler

Program Manager:
Carlos Torrez

Principal Investigator:
Hui Xu

Technology Maturity (TRL)

Start: **3**
Current: **5**
Estimated End: **5**



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Technology Areas

Primary:

- TX03 Aerospace Power and Energy Storage
  - TX03.2 Energy Storage
    - TX03.2.1 Electrochemical: Batteries

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System